



How Semat Can Change The Future of Software Engineering

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Introduction



Semat founders
Bertrand Meyer, Richard Soley,
Ivar Jacobson

- ♦ **SEMAT stands for Software Engineering Method and Theory**
- ✓ **Includes industry, academia, and research**
- ✓ ***“refound software engineering based on a solid theory, proven principles and best practices”***

Topics

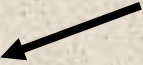
- ✓ **Background and Goals**
- ✓ **The Challenge & Big Picture Solution**
- ✓ **Semat Architecture & Way Work Accomplished**
- ✓ **What We Have Achieved So Far**
- ✓ **A Little More Detail**
 - **A Few Terms**
 - **The Universals**
- ✓ **Why Semat is Important to Future and Potential Significant Savings it Can Bring**

From the Semat Web Site (www.semat.org)

- ♦ *Software engineering is gravely hampered today by immature practices. Specific problems include:*
 - ✓ *The prevalence of fads more typical of fashion industry than of an engineering discipline.*
 - ✓ *The lack of a sound, widely accepted theoretical basis.*
 - ✓ *The huge number of methods and method variants, with differences little understood and artificially magnified.*
 - ✓ *The lack of credible experimental evaluation and validation.*
 - ✓ *The split between industry practice and academic research.*

Also curriculum ↗ 4

Background

- ✓ July, 2009 call for action
 - ✓ February, 2010 Semat Vision Statement published
 - ✓ February, 2011
 - 9 Corporate Sponsors
 - Over 1400 Supporters
 - 35 individual signatories
 - Over 20 volunteers have contributed significant time
 - Multiple tracks met periodically in 2010
 - Three workshops held in 2010
- Note: Watts Humphrey was an initial signatory* 

Goal

Note: Quite small!



- ✓ A “kernel of widely agreed elements”

Note: Referred to as “Universals”



- ✓ *This common ground will allow people to easily describe the essentials of their current and future practices and methods so that they can be*

*composed, simulated, compared,
evaluated, used, measured, taught and
researched, adapted*

The Challenge: Today's Process Aids Landscape



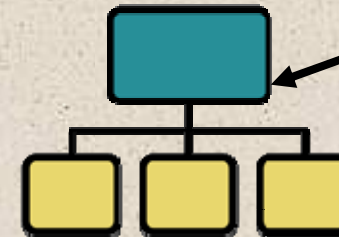
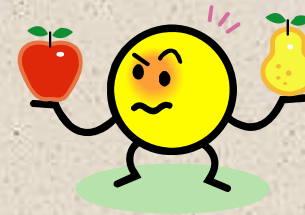
Just how different are all these process aids when it comes to helping people get their job done?

Large have Process Engineers, What about small & medium size organizations? 7

Practitioners

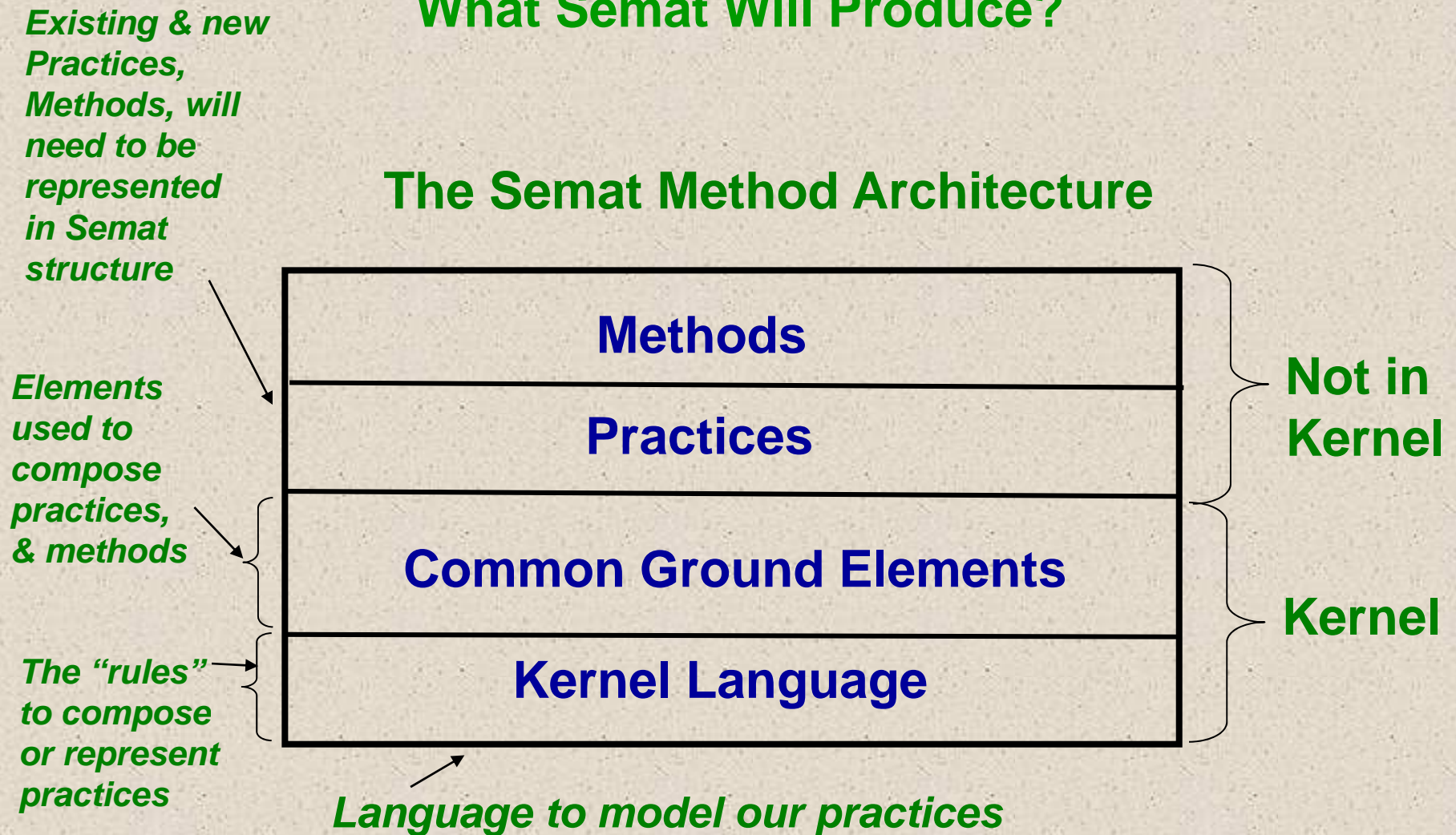
Objectives of Semat

- ◆ Help users compare practices and make better decisions
- ◆ But more...also about using... practices what do, not just what say we do
 - ◆ As team's understanding evolves it's practices must adapt – but must occur with appropriate degree of monitoring
- ◆ Can think of Semat as reference framework– but not kind you might think
 - ◆ Essentials underlie best practices, not best practices



Big Picture Solution: What Semat Will Produce?

The Semat Method Architecture



The Primary Product of Semat is The Kernel

The Way The Work Accomplished So Far: Multiple Tracks

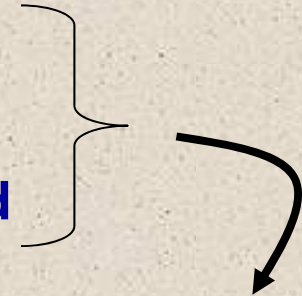
- ✓ Requirements (active early 2010) ← *Develop Use Cases (e.g. Define Practice)*
- ✓ Universals (currently active)
 - Develop the Universals
- ✓ Kernel Language (currently active) ← *“Well-formed” rules to form practices, methods*
- ✓ Assessment (active throughout 2010) ← *“Certify” practices*
 - Help users self-assess use of Semat
- ✓ Theory (planned future activity) ← *Theories supporting Universals & states*
- ✓ Architecture (new track October 2010)
 - Coordinates activities of other tracks through Architecture “Spikes”

What We Have Achieved So Far: 2010 Workshops Held

◆ Zurich, Switzerland, March 17-18



- ✓ Position papers presented by 28 attendees
- ✓ Track leaders identified & track work initiated



*Watts Humphrey
planned to attend*

◆ Washington, D.C. . July 13-14

- ✓ Track progress reports provided by track leaders to 21 attendees



◆ Milan, Italy, Sept 30-Oct 1



- ✓ Track progress reports provided by track leaders
- ✓ 1st Architecture spike report provided

What We Have Achieved So Far: Products

- ✓ **A set of use cases (e.g. Define Practice) driving the work on the kernel language**
- ✓ **An initial set of Universals (8 kernel elements)**
- ✓ **A draft kernel language specification**
- ✓ **A draft assessment framework**
- ✓ **An initial architecture spike**

Example From 1st Architecture Spike

- ♦ Applied “Define Practice” Use Case to Scrum
- ♦ Results reported at 3rd Semat Workshop in Milan

- ✓ Demonstrated

- ✓ One way to “represent” Scrum in Semat Structure

- ✓ Potential to aid in comparing & aiding decisions

- ✓ “Holes” and “clashes” visibility can help

Note: Results might be obvious to expert Process Engineer, but intent to help Practitioner

Example how it can help later- actual case study

A Little More Detail: A Few Terms (still evolving)

- ♦ Practice

- ✓ A repeatable approach to doing something with a specific purpose in mind

Note: We spend a great deal of time seeking widely acceptable terms

- ♦ Way of working

- ✓ The tailored set of *practices* and tools used by a *team* to guide and support their *work*



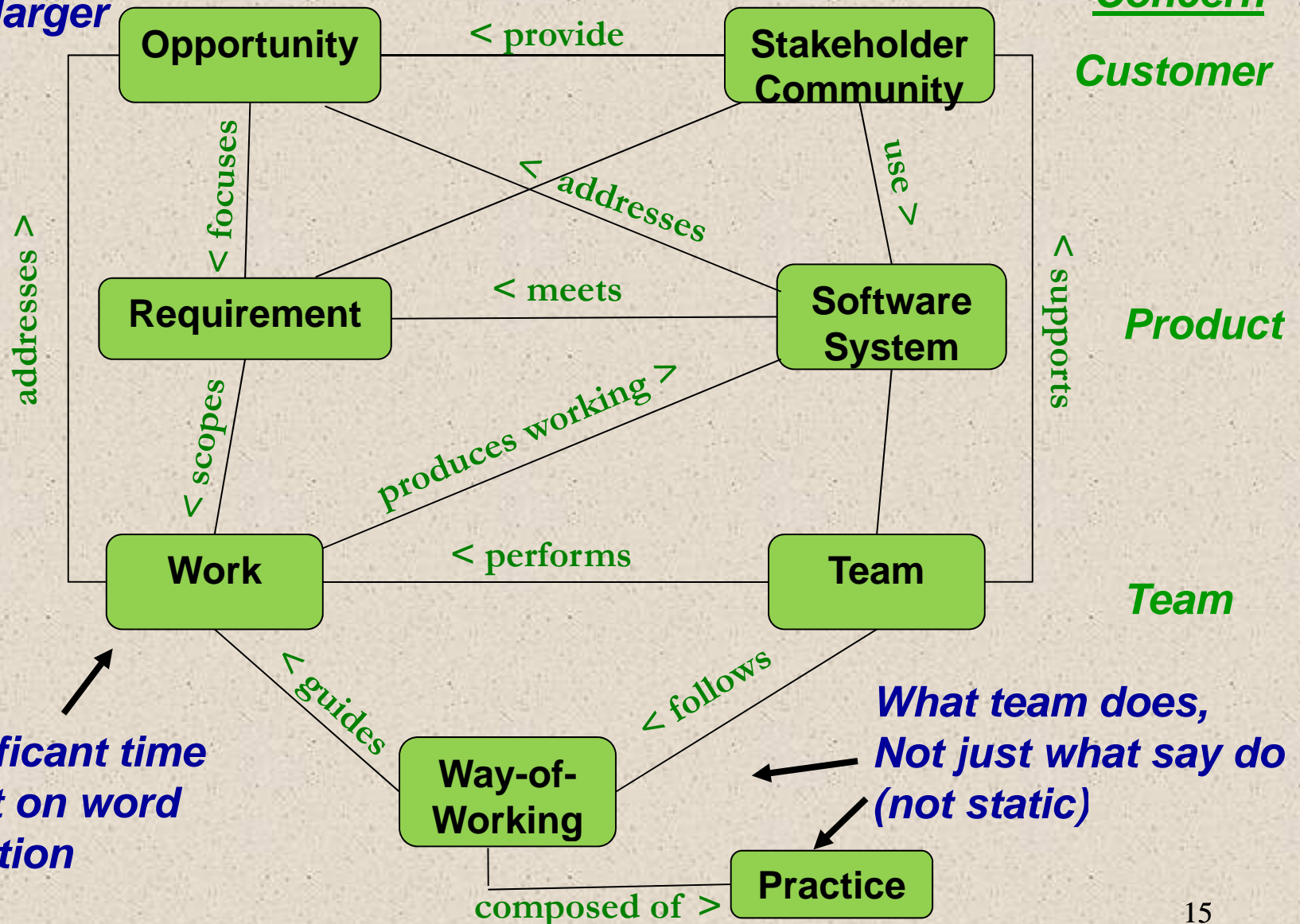
Universals (or Kernel elements)

- ✓ The essential elements in all software engineering endeavors

Don't expect model to get much larger (risk?)

Universals (Kernel elements): So far...

Area of Concern
Customer



Current Universals Challenge: Measuring Health & Progress


♦ Example: Work

✓ Can we agree on a set of Universal states and definitions?

*Potential
great
value to
Industry
(more
later)*

- Initiated
 - Work has been requested
- Prepared
 - All pre-conditions for starting the work have been met
- Underway...
- Under control...
- Concluded...
- Closed...

*Checklists support
definition using small
consistent vocabulary*



*Critical to
potential value*



Keep in mind essential states
can be extended, but not
deleted or redefined

Why Important to Academia?

- ♦ Today different universities have different requirements related to how software engineering should be taught and what should be taught
- ♦ To academia a kernel based on a common ground means a consistent foundation to teach software engineering and to demonstrate to students the pros and cons of different ways of working



Engaging the Universities is a priority of Semat

Why Important to Practitioner?



Learning curve expensive for all of us & frustrating to practitioner

Why Important to Industry?

- ◆ Consider the significant expenditures that occur today on each new project start up

- ◆ Terminology reinvention
- ◆ How progress measured and reported
- ◆ Process tailoring



95% done!
(Based on
what?)

*Not saying some of
this isn't needed, but...*

- ◆ Are the differences across different projects and different companies large enough to warrant the degree of continual reinvention?

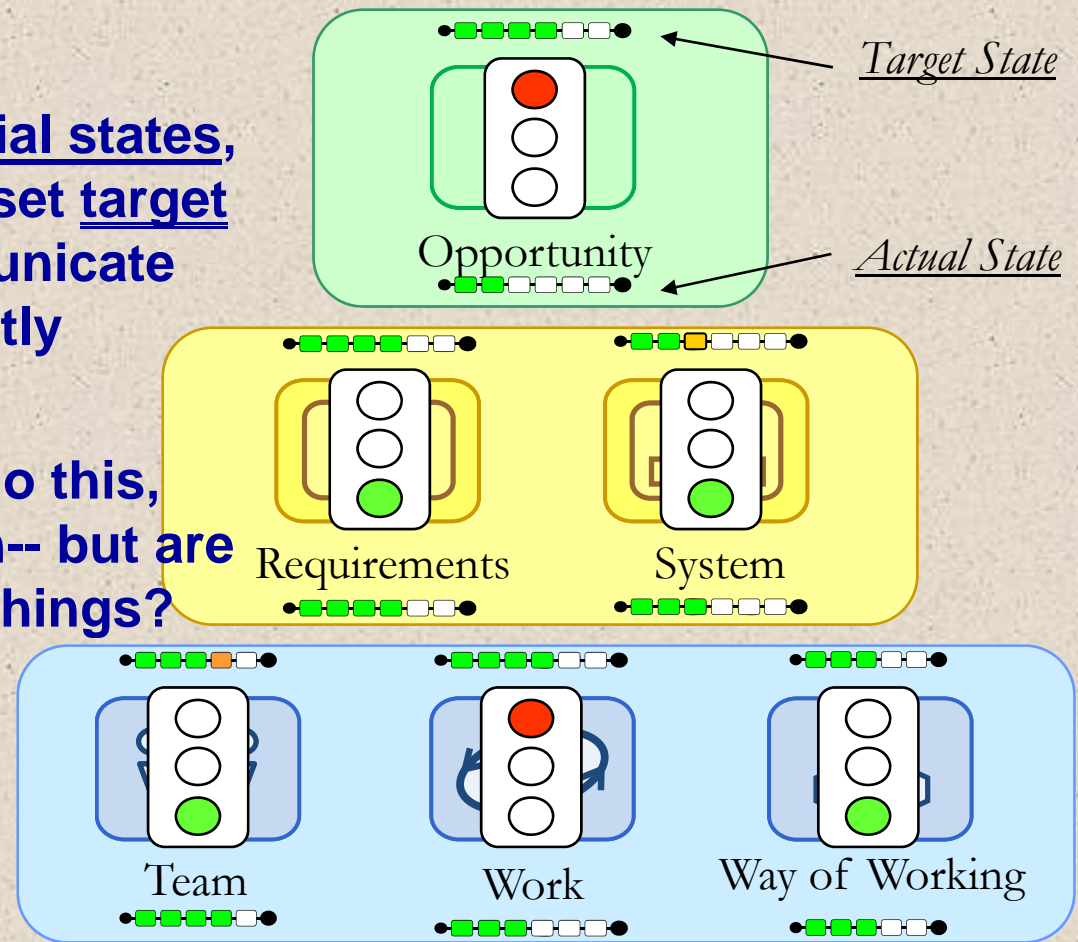
- ◆ We believe what we need to agree on is very small, but the potential savings is significant in project start up costs, improved communication & training!

Next: Measurement Example

Why Important to Industry: Measurement Example

- ♦ Think of the potential value of a “common ground” starting point for measurement
- ♦ If we can agree to essential states, & their meaning, we can set target states & assess & communicate progress more consistently
- ♦ Today great companies do this, but each grows their own-- but are they looking at the right things?
 - ♦ Example later

Improving progress measurement has huge cost savings potential



Why Semat Goals Are Achievable: Common Ground Same as Tailor Up From “Must dos”

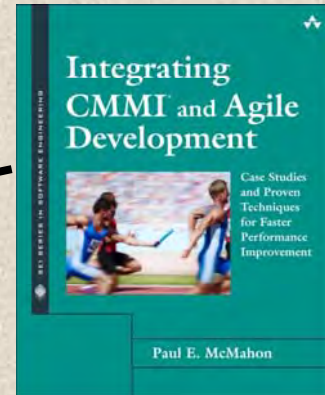
- ♦ Tailor up from “must dos”

- ✓ Proven approach

*What all agree “must do”
regardless of factors*

- ✓ Refer to BOND and GEAR case studies in [1]

Saves significant project start up and training costs because don’t need to discuss & reinvent on each project!



Small project may need little more, but

Keep aware:

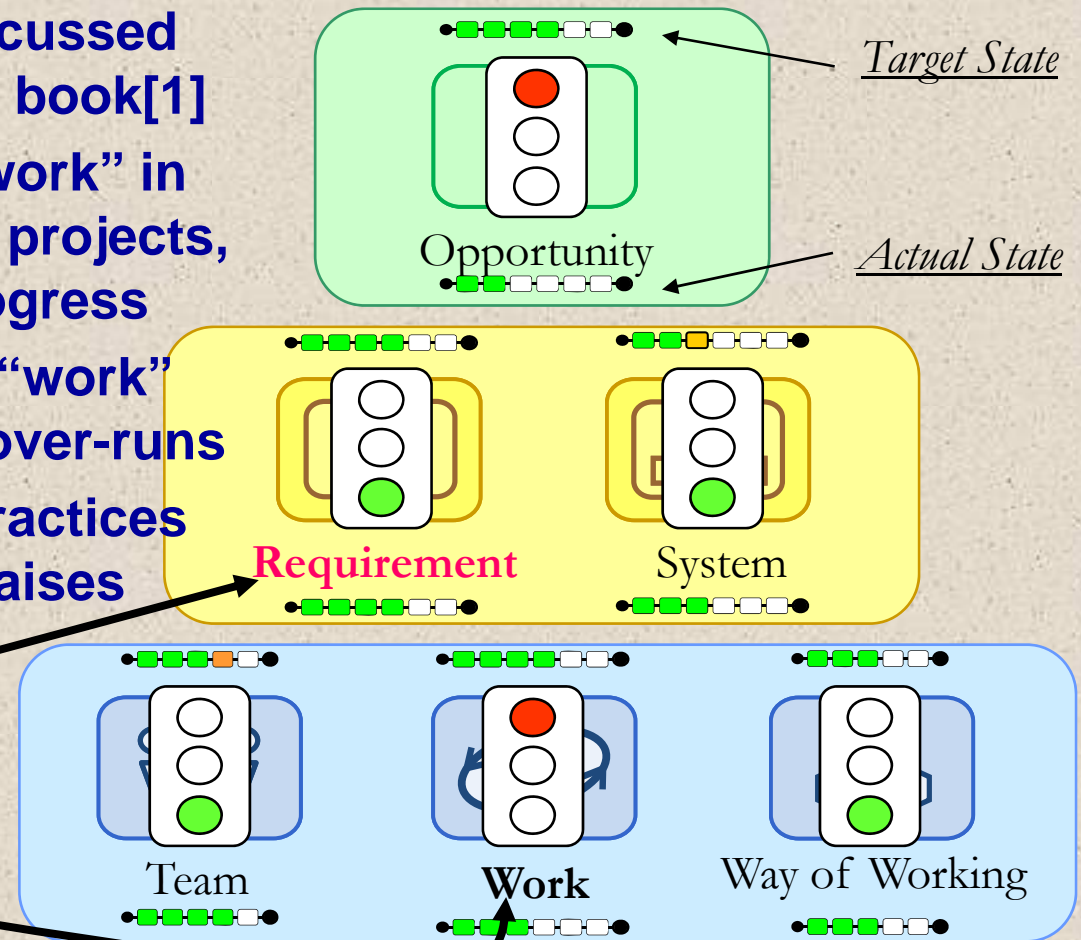
Depending on project specific factors, you extend, or “tailor up” focusing your start up effort on value-added areas

[1] Integrating CMMI and Agile Development: Case Studies And Proven Techniques for Faster Performance Improvement

Actual Case Study Example: Measurement

- ♦ LACM is Case Study discussed in previously referenced book[1]
 - ♦ Defined states for “work” in common way across projects, and tracked work progress
 - ♦ Frequent unplanned “work” leading to schedule over-runs
 - ♦ Representing their practices using Semat kernel raises visibility of a “hole”

Tracked work, **not** requirements



How Semat kernel can raise visibility of why organizations have trouble meeting schedules

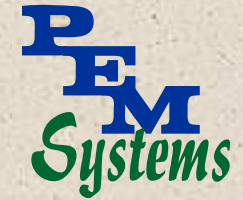
Summary:

What Is Really Different About Semat?

- ♦ Semat will not produce a methodology, nor will it compete with any previous movements
 - ✓ We don't believe past movements, or existing aids (e.g. CMMI) were failures (value in each)
- ♦ In fact we believe underneath the constant change across last 4 decades lies “universals” that do not change
 - ✓ Essentials that remain when one movement loses steam, and another rises – “common ground”
- ♦ If can agree on terminology, language, how to describe practices & methods, then we will have made a significant contribution that can be counted on for a long time

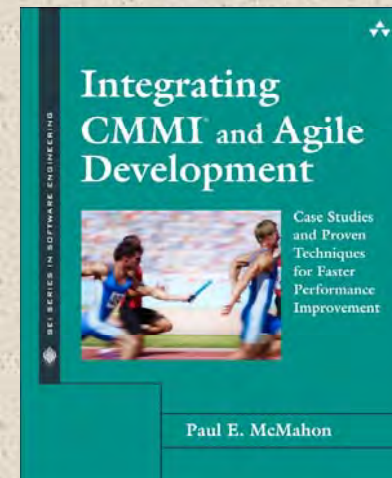


Contact Information & Questions



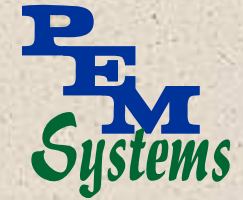
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Questions???



- ◆ Do you have a “common ground” in your organization? Is it working for you?
- ◆ Do you believe a “common ground” can be found for all software engineering endeavors?

Acronyms & References



Acronyms

CMMI – Capability Maturity Model Integration

Semat – Software Engineering Method and Theory

SPEM – Software & Systems Process Engineering Meta-model

TSP – Team Software Process

Scrum– Not an acronym, mechanisms in game of rugby for getting an out-of-play ball back into play

References & Notes

Parts of this presentation have been developed based on previous Semat presentations given at:

- Rochester Institute of Technology
“How Semat Can Change the Future of Software Engineering”, Paul McMahon, October 2010**
- SEPG Conference Portland, Oregon 2011
“The Quest for the Holy Grail of Software Engineering”
Winifred Menezes, Paul McMahon**